Second Quiz AEC 4610 Name_____

Multiple choice, 1 pt each

1. "Including an irrelevant independent (X) variable in a regression causes more severe problems in econometrics than excluding an important X variable." This statement is:
   True
   False

2. Suppose an ANOVA table from a regression model yields the following: explained sum of squares=197, residual sum of squares=64 and n=29. What is the R^2?
   a. 197/64 = 3.09
   b. 197/261 = 0.75
   c. 64/197 = 0.32
   d. 64/261 = 0.24

3 In a multiple regression like $\hat{Y} = \hat{\beta}_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 x_3 + \hat{\beta}_4 X_4$, suppose you want to test whether X3 and X4 have a jointly significant effect on the dependent variable. An appropriate test would be based upon the
   a. t distribution
   b. F distribution
   c. either t or F
   d. none of these

4. For two multiple regressions that have the same dependent variable but different independent variables, to tell which has the higher predictive power you would compare their:
   a. F statistic
   b. R^2 adjusted for degrees of freedom
   c. t statistic
   d. R^2

5. Including an irrelevant independent variable in a regression causes:
   a. biased and inconsistent estimates of all beta coefficients
   b. only the intercept is biased, all other coefficients are BLUE.
   c. biasedness, depending on how the independent variables are correlated.
   d. the betas are unbiased, but their variances may be inefficient.

6. The error term in a regression $Y = \beta_0 + \beta_1 X + e$ is assumed to be a random variable.
   1. true 2. false

D. Here is a log-log demand function for Florida grapefruit. It uses quarterly data for 1996-99 for a large fruit company.

$$LGF = \beta_1 + \beta_2 LPGF + \beta_3 LPO + \beta_4 TREND + e$$

where LGF= log of GF, the quantity of grapefruit sold (1,000 bags)
LPGF =log of PGF, the price of grapefruit ($/bag)
LPO = log of PO, the price of oranges ($/bag)
TREND = 1 for first observation, 2 for second, etc.

The OLS estimates were found with the SAS software and the results are reported on the accompanying output. Use the output for MODEL 1 to answer the following questions.

1. (1 pt) Use the estimated β's and write down the regression equation.

2. (2 pt) Calculate the demand for grapefruit when PGF= $4.00, PO=$3.00 and TREND=18.

3. (1 pt.) If the price of grapefruit increases by $1 how much will demand for grapefruit change?

4. (1 pt) If the price of oranges changes by 1 percent how much will be the percent change in demand for grapefruit?

5. According to these results, what is the quarterly growth rate for grapefruit demand? (1pt.)

6. (1 pt.) Oranges are a close substitute for grapefruit. What sign would you expect for the coefficient on the price of oranges variable?

7. (2 pts) Test the hypothesis you stated in #6.

8. (2 pts.) Perform the F test on the overall significance (0.05 level) of model 1.

9. (2 pts) Use the results from model 2 to perform the RESET test for misspecification. Do all 4 steps. Hint: $F_{STAT} = \frac{(ESS_R - ESS_{UR})/\ j}{ESS_{UR}/(n-k)}$

Variable	N	Mean	Std Dev	Minimum	Maximum
GF	16	7001.25	2351.91	1184.00	10079.00
PGF	16	3.1068750	0.5378069	2.2600000	4.2400000
PO	16	3.4318750	0.3249250	2.8500000	4.0600000
TREND	16	8.5000000	4.7609523	1.0000000	16.0000000
Q1	16	0.2500000	0.4472136	0	1.0000000

Model: MODEL1
Dependent Variable: LGF

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	4	0.78818	0.19704	0.631	0.6506
Error	11	3.43507	0.31228		
C Total	15	4.22325			

Root MSE	0.55882	R-square	0.1866
Dep Mean	8.76021	Adj R-sq	-0.1091
C.V.	6.37907		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	11.180391	2.22103241	5.034	0.0004
LPGF	1	0.492347	1.92703904	0.255	0.8031
LPO	1	-2.126949	2.26847721	-0.938	0.3686
TREND	1	-0.026943	0.05510059	-0.489	0.6345

Model: MODEL 2
Dependent Variable: LGF

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	3.08453	0.51423	4.023	0.065
Error	9	1.13872	0.12783		
C Total	15	4.22325			

Root MSE	0.56424	R-square	0.7300
Dep Mean	8.76021	Adj R-sq	0.6921
C.V.	6.44091		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	9.091555	1.56654097	5.804	0.0001
LPGF	1	0.417399	0.97540754	0.428	0.6757
LPO	1	-0.232762	0.51007722	-0.456	0.6557
TREND	1	-0.026943	0.05510059	-0.489	0.6345
Y^2	1	0.6274952	0.5292462	1.137	1.2382
Y^3	1	0.2494291	0.2392677	1.101	1.2232

Table 2 Right-Tail Critical Values for the t-distribution

DF	α - .10	α - .05	α - .025	α - .01	α - .005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
31	1.309	1.696	2.040	2.453	2.744
32	1.309	1.694	2.037	2.449	2.738
33	1.308	1.692	2.035	2.445	2.733
34	1.307	1.691	2.032	2.441	2.728
35	1.306	1.690	2.030	2.438	2.724
36	1.306	1.688	2.028	2.434	2.719
37	1.305	1.687	2.026	2.431	2.715
38	1.304	1.686	2.024	2.429	2.712
39	1.304	1.685	2.023	2.426	2.708
40	2.303	1.684	2.021	2.423	2.704
50	1.299	1.676	2.009	2.403	2.678
60	1.296	1.671	2.000	2.390	2.660
70	1.294	1.667	1.994	2.381	2.648
80	1.292	1.664	1.990	2.374	2.639
90	1.291	1.662	1.987	2.368	2.632
100	1.290	1.660	1.984	2.364	2.626
110	1.289	1.659	1.982	2.361	2.621
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.326	2.576

Source: This table was generated using the SAS function TINV.